

Sustainability in Farming Businesses: How Do Business Models Embrace the Principles of the Circular Economy?

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Abstract. The agricultural sector has undergone a profound transformation in recent years, considering environmental concerns and fostering sustainable practices (Swaffield et al., 2019). Central to this transformation is adopting innovative business models that enhance productivity and profitability and contribute to ecological sustainability (Poponi et al., 2023).

Indeed, the evolution of business models towards circularity in farming businesses unfolds through iterative experimentation, learning, and adaptation processes: initially, firms engage in waste mapping exercises to identify sources of organic waste such as crop residues, animal manure, and food processing by-products (Hofmann and Knyphausen & Aufseß, 2022). Subsequently, technological innovations such as anaerobic digestion systems and biomass gasification are deployed to convert organic waste into biogas, a renewable energy source, and other value-added products (Antoniou et al., 2019).

Integrating circular economy principles necessitates collaborative partnerships across diverse stakeholders, including farmers, technology providers, energy utilities, and policymakers (Primdahl et al., 2013; Su et al., 2022).

Moreover, external factors, including regulatory frameworks, market dynamics, and societal expectations, shape the evolution of business models in farming businesses (Su et al., 2022). In particular, policy interventions such as renewable energy incentives and carbon pricing mechanisms are pivotal in incentivizing investments in biogas infrastructure and creating a conducive environment for circular economy initiatives in agriculture (Thrän et al., 2020).

This paper explores the dynamic evolution of business models within farming businesses, focusing on integrating circular economy principles into their strategy. So, this study elucidates the multifaceted pathways through which agricultural firms innovate their business models to embrace circular economy principles.

Starting from the Business Model Canvas framework (Osterwalder and Pigneur, 2010), this study proposes the analysis of an in-depth case study (Yin, 2012) of an agricultural company that has integrated circular economy principles into its business model by building plants to create biogas.

Key themes include identifying waste streams within agricultural operations, adopting technologies for waste valorization, and strategically reconfiguring value chains to capture value from waste-derived biogas and energy.

Furthermore, the analysis shows how the company continues to invest in technological innovation, trying to enhance the digestate created by the biogas plant further, making it a fertilizer product capable of reducing fertilizer use costs and generating revenue from sales.

The study offers several implications of business model innovation for agricultural sustainability and economic viability. By valorizing waste streams, farming businesses reduce their environmental footprint, diversify revenue streams, and enhance resilience to market fluctuations. Moreover, renewable energy generation contributes to climate change mitigation goals.

Finally, this paper underscores the transformative potential of business model innovation in agricultural firms, particularly in circular economy principles for biogas and energy production from waste. By elucidating the mechanisms driving the evolution of business models and highlighting the enablers and barriers to adoption, this study offers valuable insights for policymakers and practitioners to promote sustainable development in the agricultural sector.

Keywords: Agri-business; Business Model; Sustainability; Circular Economy; biogas

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